

WHAT IS CLAIMED IS:

1. A method of high volume production of a low permeation plastic container, the method comprising:

5 a) progressively heating a plurality of thermoplastic sheets to a first temperature;

b) removing a group of thermoplastic sheets from the plurality of thermoplastic sheets;

c) heating the group of thermoplastic sheets to a second temperature; and

10 d) forming the group of thermoplastic sheets into a container.

2. The method of claim 1, wherein a) comprises positioning the thermoplastic sheets in a convection oven.

15 3. The method of claim 1, wherein b) comprises selecting the group of thermoplastic sheets that have reached the first temperature.

4. The method of claim 1, wherein b) comprises progressively heating additional thermoplastic sheets to replace the group of thermoplastic sheets removed.

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5. The method of claim 1, wherein c) comprises simultaneously heating each thermoplastic sheet in the group of thermoplastic sheets with an infrared heater.

5 6. The method of claim 1, wherein d) comprises coupling an object with at least one thermoplastic sheet in the group of thermoplastic sheets such that the object is positioned within the plastic container.

7. The method of claim 1, wherein d) comprises simultaneously vacuum-forming each thermoplastic sheet in the group of thermoplastic sheets to a surface of a mold.

8. The method of claim 1, wherein d) comprises fusing a lip formed with the group of thermoplastic sheets to form the container.

9. The method of claim 1, wherein a), b) and c) are occurring in parallel along a first processing path and a second processing path.

10. The method of claim 1, wherein d) is occurring along a common processing path.

11. A method for high volume production of a low permeation plastic fuel tank, the method comprising:

a) progressively raising the temperature of a plurality of thermoplastic sheets to a pre-processing temperature within a pre-conditioning stage;

b) indexing at least two, but less than all, of the thermoplastic sheets to a final heat stage;

c) further increasing the temperature of the at least two thermoplastic sheets to a processing temperature;

d) indexing the at least two thermoplastic sheets to a forming stage;

e) urging each of the at least two thermoplastic sheets into contact with a mold; and

f) fusing the at least two thermoplastic sheets to form a plastic fuel tank.

12. The method of claim 11, wherein the mold comprises a bottom mold piece and a top mold piece, and e) comprises urging one of the at least two thermoplastic sheets into contact with the bottom mold piece and urging another of the at least two thermoplastic sheets into contact with the top mold piece.

13. The method of claim 11, wherein a) comprises indexing additional thermoplastic sheets into the pre-conditioning stage to replace the at least two thermoplastic sheets.

14. The method of claim 11, wherein a) comprises minimizing variability in the temperature of each of the thermoplastic sheets.

5 15. The method of claim 11, wherein a) comprises maintaining the thermoplastic sheets at the pre-processing temperature.

10 16. The method of claim 11, wherein d) comprises simultaneously indexing the at least two thermoplastic sheets to the forming stage.

15 17. The method of claim 11, wherein f) comprises injecting high-pressure fluid into the mold to pack out the at least two thermoplastic sheets.

18. The method of claim 11, wherein e) comprises coupling a fuel system component with at least one of the at least two thermoplastic sheets such that the fuel system component is positioned within the plastic fuel tank.

20 19. The method of claim 11, wherein the length of time to raise the thermoplastic sheets to the pre-processing temperature is longer than the length of time to raise the at least two thermoplastic sheets to the processing temperature.

20. The method of claim 11, wherein a) comprises heating in a predetermined pattern to uniformly raise the temperature of each of the thermoplastic sheets.

21. A system for high volume production of a low permeation plastic fuel tank, the system comprising:

a pre-conditioning stage operable to heat a plurality of thermoplastic sheets to a first temperature;

a final heat stage adjacent to the pre-conditioning stage, the final heat stage operable to receive a group of thermoplastic sheets from the plurality of thermoplastic sheets and raise the group of thermoplastic sheets to a second temperature; and

a forming stage adjacent to the final heat stage, the forming stage operable to manipulate the group of thermoplastic sheets to form the low permeation plastic fuel tank.

22. The system of claim 21, wherein the pre-conditioning stage comprises a convection oven.

23. The system of claim 21, wherein the thermoplastic sheets comprise a plurality of layers.

24. The system of claim 23, wherein the final heat stage is operable to elevate the temperature such that temperature sensitive material properties of all the layers are repeatably elevated to the second temperature.

5 25. The system of claim 21, wherein the forming stage comprises a top forming stage and a bottom forming stage, the top forming stage comprising at least one top mold piece and the bottom forming stage comprising at least one bottom mold piece.

10 26. The system of claim 25, wherein the top mold piece and the bottom mold piece are separately moveable to fuse the group of thermoplastic sheets.

15 27. The system of claim 21, further comprising a bottom operator adjacent to the forming stage, the bottom operator comprising an assist mechanism and an insertion mechanism, the insertion mechanism operable to couple an object with a bottom portion of the low permeation plastic fuel tank.

20 28. The system of claim 27, wherein the object comprises at least one of a fuel pump, a structural enhancement, a sensor and a valve.

29. The system of claim 21, further comprising a top operator adjacent to the forming stage, the top operator comprising an assist mechanism and an insertion mechanism, the insertion mechanism operable to couple an object with a top portion of the low permeation plastic fuel tank.

30. The system of claim 21 wherein the pre-conditioning stage comprises a first pre-conditioning stage and a second pre-conditioning stage operable in parallel.

31. The system of claim 21, wherein the final heat stage comprises a first final heat stage and a second final heat stage operable in parallel.

32. The system of claim 21, wherein the final heat stage comprises an infrared heater.

33. The system of claim 21, further comprising a packing mechanism, the packing mechanism operable to pressurize the mold during the forming stage and further conform the group of thermoplastic sheets to the shape of the low permeation plastic fuel tank.

34. The system of claim 21, wherein the pre-conditioning stage is operable to maintain thermoplastic sheets at the first temperature.